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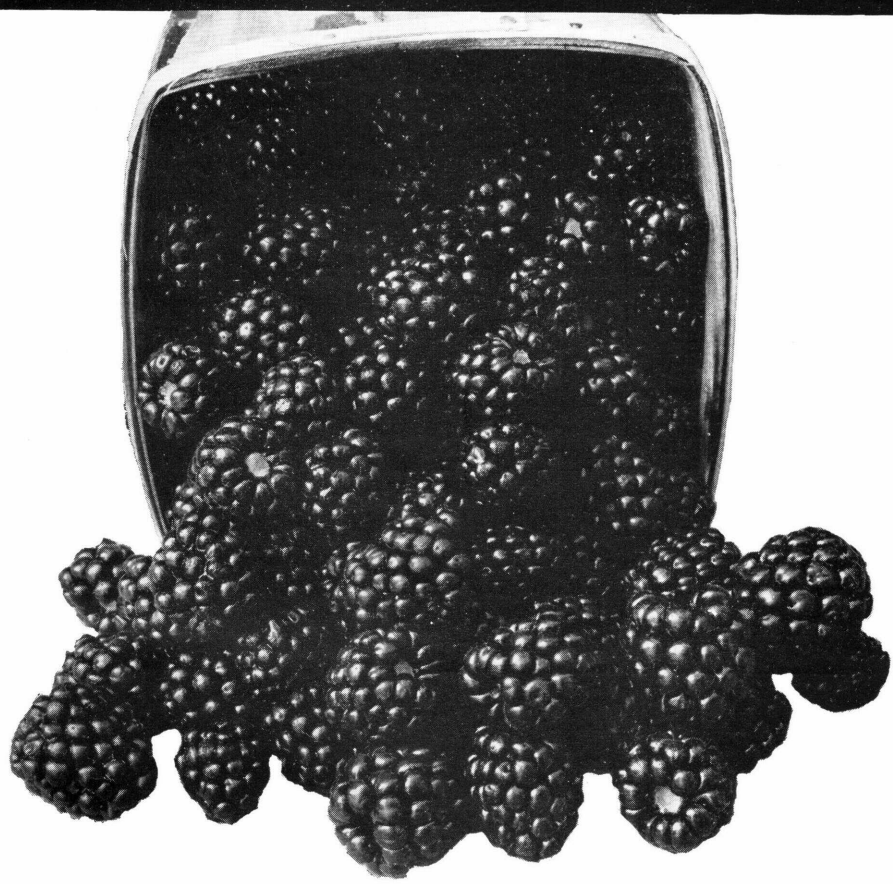
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BLACKBERRY

G R O W I N G

Erect and Trailing

BLACKBERRIES



Farmers' Bulletin No. 1995
U. S. DEPARTMENT OF AGRICULTURE

BLACKBERRIES have become so popular for canning, for jam and pie making, and as a fresh fruit that the demand for them is increasing. Also, the use of improved methods of cultivation and of selected varieties has lengthened the season of production and marketing.

The longer season, greater demand, and better quality have made the commercial growing of blackberries—both erect and trailing (dewberries)—profitable in many States. In some sections they have become one of the important crops.

Successful blackberry growing depends largely upon selecting the varieties suited to the locality and to the purposes intended. Descriptions of the leading erect and trailing varieties are given in this bulletin, along with directions for their propagation, cultivation, fertilization, training, and pruning. To reduce the cost of the field, especially during the first year, crops between rows and cover crops are recommended. The use of the practical methods described will reduce damage from diseases and insects.

This bulletin is a combination and revision of Farmers' Bulletin No. 998, Culture of the Logan Blackberry and Related Varieties, Farmers' Bulletin No. 1399, Blackberry Growing, and Farmers' Bulletin No. 1403, Dewberry Growing, and supersedes these publications.

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GROWING ERECT AND TRAILING BLACKBERRIES

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IMPORTANCE OF CULTIVATED BLACKBERRIES

BLACKBERRIES were cultivated in 1939 on about 27,000 acres in the United States, according to the Sixteenth Census (1940). Figure 1 shows the areas where these berries were grown. They are cultivated generally over a wide area extending westward and southwestward from New Jersey and North Carolina to Kansas, Oklahoma, and Texas. Outside this area they are grown in California and southwestern Michigan and to some extent in New York and western Oregon and Washington. It is difficult to estimate the acreage devoted exclusively to erect blackberries, because trailing blackberries (called dewberries in some sections of the country) are grown with them to some extent in nearly all sections. It is known that considerable of the acreage in southwestern Michigan and southern New Jersey and all of that in central North Carolina are devoted to trailing blackberries. Texas has the largest acreage in blackberries, over 6,400 acres; Oregon has the second largest, over 5,000 acres; other States with large acreages in blackberries are Oklahoma, Arkansas, Washington, California, Michigan, and North Carolina.

The cultivation of blackberries has extended much less rapidly than would have been the case had not the wild forms been found in such abundance in nearly every section of the country. With the gradual introduction of new and better varieties especially adapted to dif-

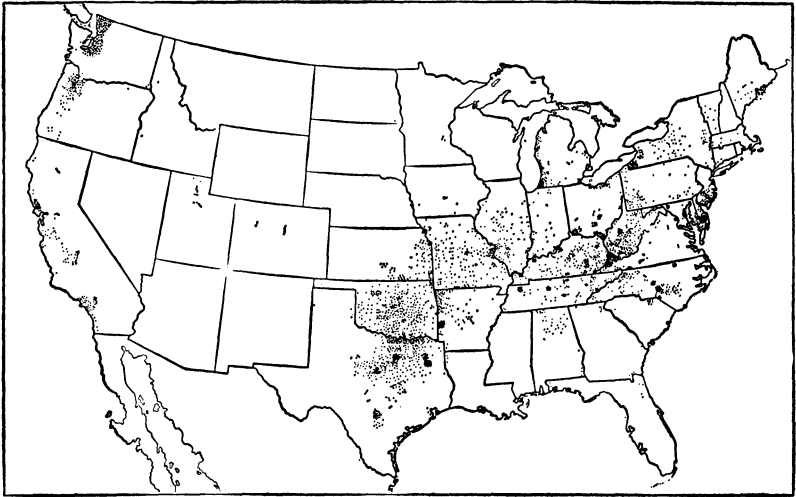


Figure 1.—Outline map of the United States showing areas where erect blackberries or trailing blackberries (dewberries) were grown in 1939, as reported in the Sixteenth Census. Trailing blackberries are important in southwestern Michigan, southern New Jersey, and central North Carolina.

ferent sections, however, the superior size and quality of the cultivated berries are being recognized. Commercial varieties produce firmer fruit, which can be kept in good condition longer after picking. Moreover, through proper selection of varieties fresh cultivated blackberries can be obtained in most sections before the first wild ones ripen and long after the last wild ones are gone. As these points of superiority become more widely known, cultivated varieties will be grown more generally.

GENERAL COMPARISON OF ERECT AND TRAILING BLACKBERRIES

The blackberry has a root that lives for many years and a top that lives only 2 years. It bears fruit upon canes grown the previous year. These canes die soon after they have fruited. The trailing blackberry differs from the erect blackberry in having canes that trail on the ground or climb over brush and shrubs. From this habit it receives the names "running blackberry," "ground blackberry," and "dewberry." Canes of the trailing blackberry form new plants by rooting at the tips, whereas the erect blackberry propagates itself by suckers. The fruit clusters of the trailing blackberry are usually small and open; those of the erect blackberry are larger and denser (fig. 2).

The trailing blackberries produce fruit similar to that of the erect blackberries, but because their berries ripen earlier than those of most erect blackberries the culture of trailing blackberries has proved profitable in many sections. Because the canes have less woody fiber and must be fully supported, the methods of raising them differ considerably from those used for erect blackberries.

The principal cultivated varieties of trailing blackberry are in reality hybrids between erect and native trailing species. In the wild many such naturally occurring hybrids occur—some with trailing canes and some with arched canes, but nearly all root at the tips.

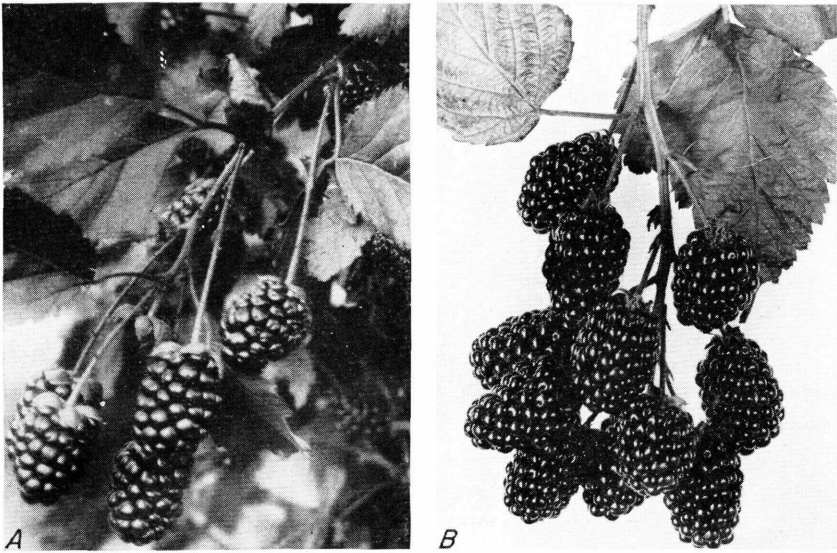


Figure 2.—Fruit clusters of (A) the Lucretia trailing blackberry and (B) the Early Harvest erect blackberry. Note the smaller cluster of the Lucretia with its long berry stems as compared with the larger and denser cluster of the Early Harvest.

All the native blackberries of the Pacific coast have trailing canes that root at the tips. The Himalaya and Evergreen varieties of blackberry, introduced from Europe, are semitrailing and root at the tips of the canes.

CHARACTERISTICS OF A SUITABLE LOCATION

The principal factors to be considered in selecting a location for a commercial blackberry plantation are the facilities for marketing the fruit and the moisture conditions of the soil. The fruit of most varieties is tender, and the keeping qualities are seriously affected by the jarring of the berries on rough roads. The berries should therefore be grown near good roads and placed on the market as soon as possible after being picked.

The moisture supply in the soil at the ripening season and during the winter or dormant months is the most important factor to be considered in selecting a site. The blackberry suffers more than almost any other crop if its water supply is insufficient while the berries are growing and ripening. The fruit of the erect blackberry, with its shallow root system, ripens in midsummer, later than the fruit of the strawberry and raspberry, when evaporation of soil moisture is most rapid. Droughts are, therefore, a serious menace. On the other hand, the plants are often killed if water stands on the plantation during the winter, or dormant period. The trailing blackberries usually have rather deep root systems and ripen earlier than most erect varieties; therefore they suffer less from drought.

In the Southern and Middle Atlantic States the planting should not be situated near wild blackberries. Rosette (double blossom) and orange rust, as well as the red-necked cane borer and the strawberry weevil, may spread to the cultivated planting from the wild plants.

Eradication of the wild plants or control of the diseases and pests may be necessary in sections where these are serious.

In sections where there are frequent drying winds during the ripening period or during the winter, it is important to choose a sheltered location. Low places, where there is danger from late frost which may kill the new growth and destroy all prospects of a crop, should be avoided. High land with good air drainage should be selected.

Though wild blackberries are abundant in the northernmost part of the eastern United States and even in Canada, they are found chiefly in woods and thickets, where there is protection from cold, drying winds in winter. Furthermore, cultivated varieties are selections from wild species of blackberries which are found mostly in the more temperate parts of the country rather than from the species native to the colder and more exposed locations in the North. For these reasons cultivated varieties are chiefly adapted to the more temperate parts of the country.

SUITABLE SOILS AND THEIR PREPARATION

Blackberries will flourish on nearly any type of soil, if they have suitable moisture conditions. The finest wild berries are found in localities where the humus and soil conditions are such that the plants can get a proper supply of water. The best blackberry land is a deep, fine, sandy loam with a large supply of humus. Such a soil is to be preferred to a coarse, sandy or a clay soil. The largest yields are produced on soils having mellow subsoil that allows the roots of the plants to penetrate deeply for plant food and moisture.

In Oregon the Logan, Boysen, and Young varieties are grown on the fertile, deep, clay loams that are well drained but have clay subsoils. Very few plantings are on the poor red hill soils, but some are on the sandy soils of the river bottoms.

The land on which blackberries are to be grown should be planted with a cultivated crop for one or two seasons before the blackberry plants are set. This will insure the thorough rotting of the sod. The soil should be plowed about 9 inches deep in the spring, and the whole field should be thoroughly harrowed before the plants are set.

PROPAGATION AND PLANTING

Blackberry plants may usually be purchased from reliable nurseries at a reasonable price; in starting a new plantation the grower usually makes such a purchase. Growers who already have plantations usually raise their own plants.

PROPAGATION

It is the habit of erect blackberries to send up suckers from the roots at various distances from the parent plant, especially when the roots are cut; in addition canes grow from the crown. New plants are usually obtained by digging up these suckers; if the suckers are vigorous and well-rooted this method of starting new fields is very satisfactory. Another method is to dig roots one-fourth inch or more in diameter in the fall or early spring. These are cut into pieces about 3 inches long and planted horizontally in trenches about 3 inches deep. By the following fall they should have become strong plants (see fig. 4, B) generally with better root systems than those of sucker

plants, which depend upon the single large root of the parent plant for most of their food and water.

Certain varieties are hybrids of erect and trailing blackberries, which have canes that root at the tips, just as trailing blackberries do. The Evergreen, Brainerd, and Himalaya varieties, although not recent hybrids, also have canes that root at the tips. New plants of these varieties and of all trailing blackberries are obtained either by covering the tips with 2 or 3 inches of soil or by making root cuttings as described for erect blackberries. Stronger tip plants are sometimes obtained if the tips are pointed straight down when covered. A rooted tip is cut off 4 to 6 inches from the ground when it is dug for transplanting. Although all trailing blackberries will root at the tips of the canes in late summer and fall and the rooted tips can be used for field planting the next spring, 10 to 20 times as many plants can be obtained from root cuttings. The root cuttings, of course, must be started 1 year earlier.

PLANTING

Blackberry plants usually are set during the winter and early spring in the South and as early in the spring as the land can be properly prepared in the North. The soil generally contains more moisture at such times, and the young plants can make a vigorous start. The earlier they are set, the larger the proportion that live and the better they grow. They should be set as deep as they formerly stood in the nursery or slightly deeper, and the soil should be thoroughly packed about the roots. In setting erect blackberries special care should be taken to plant them deep enough, for the canes break over easily if the crowns project above ground. Before the plants are set, the tops should be cut back to 6 inches or less.

Figure 3 shows blackberry plants as received from the nursery, heeled in until the permanent planting can be made. The heeling in prevents the roots from drying out. In figure 4, *A*, is shown a strong tip-rooted Lucretia plant ready to be set and in figure 4, *B*, a root cutting of the Young variety.

Planting distances for the Evergreen and Himalaya varieties are given on pages 31 and 32. In the Eastern States the erect blackberries are usually planted $2\frac{1}{2}$ to 3 feet, sometimes 4 feet, apart in rows 8 feet apart. These distances allow cultivation in but one direction. For

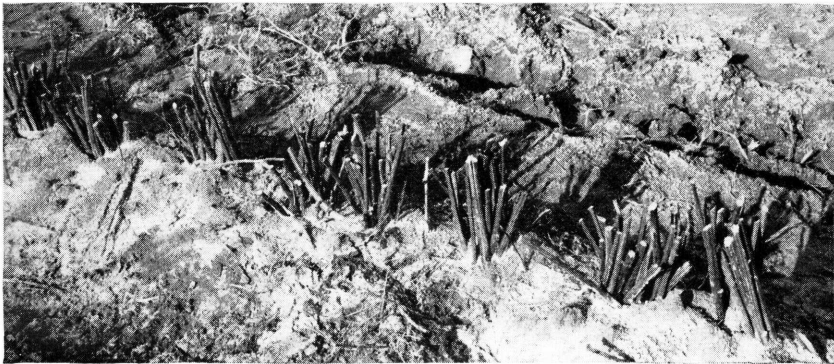


Figure 3.—Blackberry plants from the nursery, heeled in to keep the roots moist until the field is ready to plant.



Figure 4.—A, Tip-rooted plant of the Lucretia trailing blackberry ready to be set; B, vigorous root cutting of the Young trailing blackberry after about 2 months' growth.



Figure 5.—Field of Lucretia trailing blackberries set 5 by 5 feet apart, bearing a good crop the year after it was planted in North Carolina. (Photographed June 12.)

cultivation in both directions the plants of erect sorts are usually set 5 by 5 feet. This distance should be increased to 7 or 8 feet both ways if the growth is very heavy. Very little hand labor is needed when the plants are set according to this plan, as the cultivation keeps down both weeds and suckers.

For the Lucretia variety the hill system of training (fig. 5) is commonly used in North Carolina, and the plants are usually set 5 or 6 feet apart each way. If the canes are to be trained in solid rows, the plants are usually set in New Jersey 3 feet apart in rows which are 4 to 6 feet apart and in Michigan $2\frac{1}{2}$ feet apart in rows 7 feet apart. In the Germantown district of New York they are set 2 feet apart in rows 7 to 8 feet apart. The Young and Boysen varieties in the Southern States are set 8 to 10 feet apart in rows 8 to 10 feet apart. Even when trained to stakes they should be at least 7 feet apart each way and 8 feet is preferable. On the Pacific Coast the rows are usually 7 to 10 feet apart so that a small tractor can be used for cultivation. The plants are also set 7 to 10 feet apart in the row.

POLLINATION

Practically all the erect-blackberry varieties that have no trailing-blackberry parentage and most varieties of trailing blackberries are entirely self-fertile; therefore, they may be planted by themselves without provision for cross-pollination.

The McDonald, Mammoth, and some other varieties not so well known, however, are imperfect pollinizers under certain conditions. They should not be planted in large blocks alone. The Early Wonder is suggested as a pollinizer for the McDonald. The Premo, Rogers, and Advance, which are unfruitful when planted alone, should be planted only with other varieties. Growers in California include two distinct varieties in what they term "Advance." These pollinate each other.

GROWING INTERCROPS AND COVER CROPS

INTERCROPS

During the first summer after the blackberry plants are set, some crop requiring constant cultivation throughout the growing season may be grown between the rows. The growth of this crop should not be large enough to shade the blackberry plants. A suitable intercrop should greatly reduce the cost of the berry field during the first summer without injuring the plants. Truck crops, such as cabbage and potatoes, are preferable, and corn and the small grains should be avoided. Only a single row of most truck crops should be grown between the blackberry rows. It is best not to grow crops that require cultivation later than August as the young blackberry canes then need all the room. By the second summer the plants should be large enough to occupy the entire space.

COVER CROPS

At the last cultivation some growers sow a cover crop broadcast in the plantation or drilled between the rows, to be turned under the following spring. Cowpeas or spring oats broadcast at the last cultivation or rye and vetch drilled in rows in the middles are sometimes used. Wherever possible, cover crops should be used, as they help to protect the canes during the winter, prevent the land from washing, and add humus to the soil. If cowpea vines grow very long,

they may increase the expense of tying up the canes in the spring, but the value of the cover crop will usually more than offset this.

In Oregon and Washington cover crops are in general use. They are usually drilled between the rows during September and October. Oats with vetch or Austrian Winter peas are most generally grown.

CULTIVATION

Whether or not an intercrop is grown, cultivation should be begun as soon as the plants are set in the spring, should be often enough to keep the planting free from weeds throughout the season, and usually should be discontinued at least a month before freezing weather. Since the roots of blackberries ordinarily are close to the surface of the ground, cultivation must be shallow. Breaking the roots not only weakens the root systems of the plants but also increases the number of suckers. The deeper the soil and the more thorough its preparation before the plants are set the deeper will be the roots. Frequent cultivation is of greater importance during the growing and ripening season of the berries than at any other time, since they require more moisture then.

In the Eastern States when the canes of trailing blackberries which are allowed to trail on the ground for the first year begin to interfere, cultivation is discontinued and nothing further is done in the field until the following spring except where winter protection is necessary. If later cultivation is required, the canes should be carefully pushed to one side. Any work among the plants during the fall or winter is likely to injure the canes, which become very brittle. If they are bruised or partially broken they may break off at that point during the next fruiting season and thus the fruit will be lost.

On the Pacific coast, cultivation should follow soon after rain or irrigation because the soil may become hard and crack. The grower should remember that deep cultivation should be avoided because it cuts many roots. A grape hoe (fig. 6, *A*) has been found useful to clean weeds under the trellis and thus save hand labor. By a simple adjustment the soil can be thrown toward the vine or the bush or away from it. The hoe is guided easily by the disk to which the handle is attached. The point of the hoe must not turn down when in use. A spring-tooth attachment (fig. 6, *B*) may be used for cultivating.

In most sections the canes are tied to stakes or wires before growth starts in the spring. Cultivation should be started immediately after growth begins and continued at frequent intervals until the new canes begin to interfere, usually some time in August. In New York,

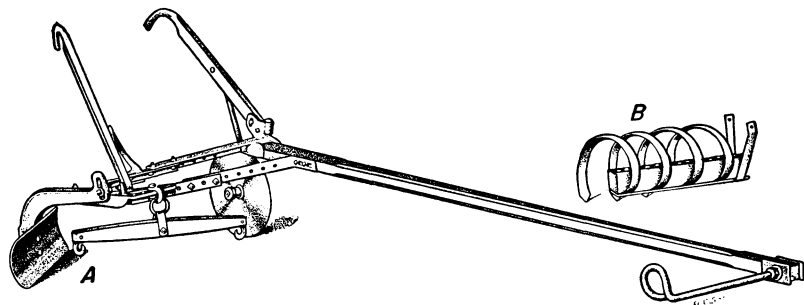


Figure 6.—*A*, Grape hoe, which can be used in trailing-blackberry fields to save hand labor; *B*, spring-tooth attachment for use in cultivating.

however, cultivation usually ceases by picking time. Weeds which come in later are left to protect the canes in winter.

FERTILIZATION

The use of fertilizers in blackberry fields must be governed by the same principles that apply to their use with other fruits. As soils vary in the quantity and availability of the plant food they contain, the fertilizer problem is a local one which each grower must solve for himself.

Stable manure is the best fertilizer, for in addition to supplying both major and minor elements of plant food it adds much humus to the soil. An annual application of 20 tons of stable manure to the acre will usually be sufficient, although there is little danger of using too much, especially after the plants are in bearing. In order to supply humus, leguminous and other cover crops should be plowed under before the plants are set or grown between the rows of blackberries each year. When such crops are grown, less stable manure will be required. Where stable manure is not available, an annual application in April of 600 to 1,000 pounds of a 4-8-4 fertilizer should be tested. More nitrogen is needed toward the southern limits of blackberry production.

Pacific coast growers do not as a rule use much commercial fertilizer, and there is no experimental evidence of its value there. Where stable manure is available, annual applications of about 10 tons per acre are made. Poultry manure is often applied at the rate of 3 or 4 tons per acre.

In one North Carolina district the Lucretia trailing blackberry is grown on coarse, sandy soils. These soils as a rule are lacking in most of the elements of fertility, and the application of a complete fertilizer is usually necessary. Although larger quantities of fertilizer are applied than may be generally necessary, the following description of the practices of successful growers in this district may prove of interest:

As soon as the plants have become established and are 2 or 3 inches high, cottonseed meal or stable manure is used to encourage a vigorous growth the first season. Some growers use about 500 pounds of cottonseed meal, whereas others use 10 to 15 tons of stable manure per acre.

After the first season two applications of fertilizer are given each year, the first one being made as soon as the canes have been tied up in the spring. At this time a complete fertilizer, composed of 2 or 3 percent of nitrogen, 10 percent of phosphoric acid, and 8 percent of potash, is usually applied. A few growers, having found that they do not need nitrogen for their soils, apply only potash and phosphoric acid. The quantity applied likewise varies with the soil and with the different growers, but 500 to 700 pounds per acre of a fertilizer analyzing 2-10-8 is commonly used.

The second application of fertilizer is made immediately after the fruit has been picked, and all the canes, both old and new, are cut off, the object being to induce a rapid growth of vigorous new canes for the next year's crop. A fertilizer containing a large proportion of nitrogen is used at this time. Either stable manure or cottonseed meal is commonly used. An application of 500 to 600 pounds of cottonseed meal per acre is considered sufficient, but some growers use as much as 1,000 pounds. Growers using stable manure consider an application of 10 to 20 tons per acre sufficient.

PRUNING AND TRAINING

As soon as the last berries have been picked, the old canes that have just borne should be cut out and burned. This allows the young canes

more room for development, conserves the moisture supply, and destroys any insects or diseases on the old canes. Rarely will it be necessary to leave the old canes of the erect varieties to help support the new canes during the winter snows. Wire trellises usually are preferable where support is needed. For each plant, not more than 3 or 4 new canes of the erect varieties, 4 to 8 canes of the semitrailing, and 12 to 16 canes of the trailing should be allowed to grow in one season; all other canes should be cut out not later than at the time of removing the old bearing canes. The remaining canes will be larger and stronger because of the thinning. When suckers are allowed to form, about 3 canes per lineal foot of row are left.

ERECT AND SEMITRAILING BLACKBERRIES

If all the suckers of erect varieties were allowed to grow, by the end of the second year the field would be a dense thicket of canes and the berries could be picked only with great difficulty. The suckers would compete with the parent plants for plant food, moisture, and light, and the whole plantation would be inferior. The plants, therefore, must be kept in rows or hills (fig. 7); all suckers appearing between the rows must be destroyed by the frequent use of cultivator and hoe. Suckers do not come up again so quickly if they are pulled as if they are cut off, but pulling requires much hand labor. If all suckers are destroyed, the plants will have much stronger roots and canes and the berries will be larger and better. Before growth starts in the spring weak and surplus canes should be removed and the lateral branches cut back as shown in figure 8, *B*. Though varieties differ in their fruiting habits, the laterals of most varieties should be cut back to about 12 inches. Under conditions when all buds become fruit buds the laterals of erect blackberries may need to be cut back to 6 to 8 inches.



Figure 7.—Bases of erect-blackberry plants, about 3 feet apart in the row, with all suckers removed.

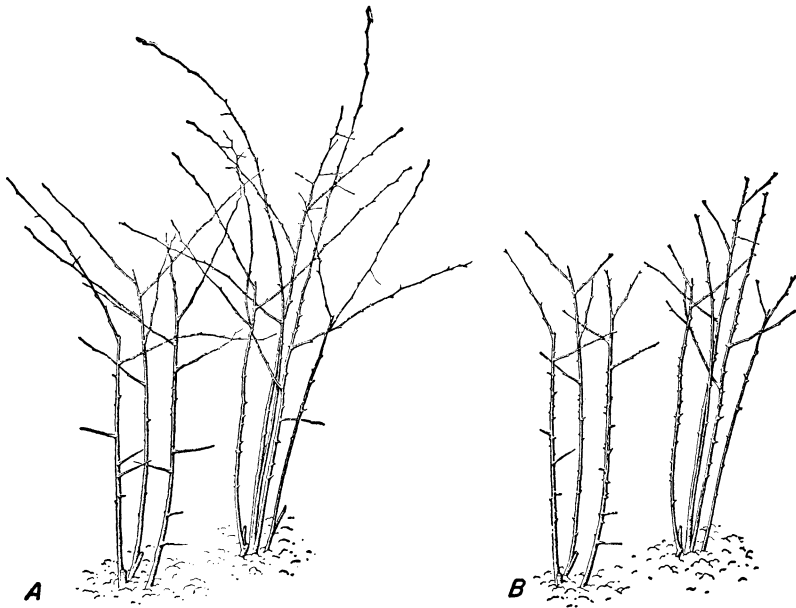


Figure 8.—Erect-blackberry plants (A) before pruning and (B) after winter pruning.

The systems of training differ with conditions in different parts of the country. In some sections where the plants do not grow large and the soil does not wash, the new canes may be topped—that is, the tips pinched off with the fingers—when they reach a height of not more than $2\frac{1}{2}$ feet. When the bushes are very vigorous, the height may be increased to 3 feet. As not all the canes reach a height of $2\frac{1}{2}$ feet at the same time, the plantation must be gone over several times at frequent intervals. The pinching causes the canes to branch and to be better able to stand up with a heavy crop of berries. Figure 8 shows plants trained in this manner.

Even when this method of training is used, the canes may be bent over and broken in cultivating or picking and the number of canes and the yield of fruit will thus be materially reduced. If this is the case, a wire trellis will save enough fruit to be a profitable investment. Such a trellis consists of posts set 15 to 30 feet apart in each row of blackberries and having a wire stretched between them about $2\frac{1}{2}$ feet above ground. The canes are tied to this wire, which keeps them upright and makes cultivation and picking much easier. Figure 9, A, shows a detailed drawing of such a trellis. A variation of this trellis is made as follows: Crosspieces about 18 inches long are nailed to each post near the top. Two wires, instead of one, are stretched along the line of posts through holes near the ends of the crosspieces. The blackberry canes are simply kept inside these wires, which support them on either side (fig. 9, B).

These systems of training are adapted to certain varieties and to districts where the bushes do not grow very high. When the canes grow very long or are inclined to run somewhat like a grapevine, as do those of the Evergreen, Brainerd, and Himalaya, a much higher trellis is used; this trellis has two wires, one about 5 feet and the other

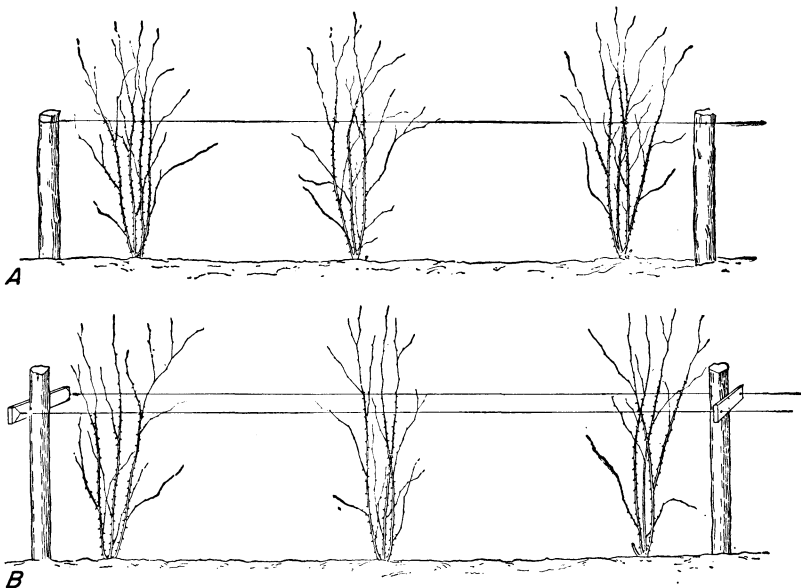


Figure 9.—Canes of erect blackberries (A) tied to a single wire and (B) held between two wires.

about 3 feet from the ground, the height depending upon the size of the plants. Figure 10 shows such trellises. The canes of the erect varieties are simply fastened to the wires, while those of the semitrailing varieties are tied either horizontally along the wires or in a fan-shaped position.

A variation of this trellis is used in some sections where semitrailing varieties such as the Brainerd, Evergreen, and Himalaya are grown. To each post are nailed two crosspieces 18 or 20 inches long,

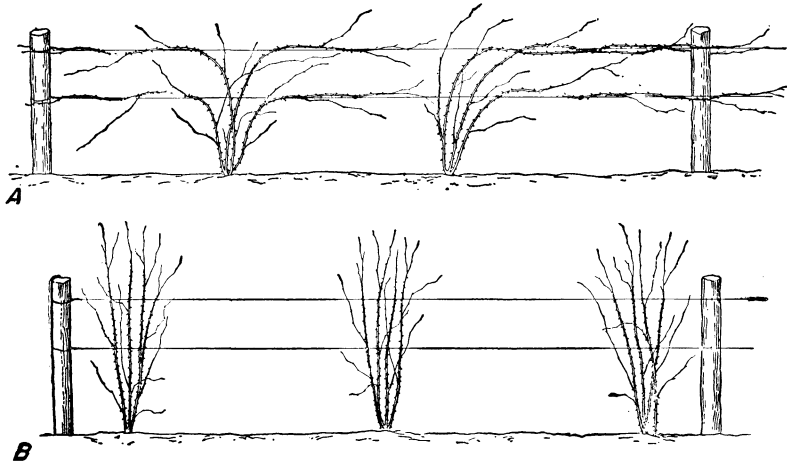


Figure 10.—Canes of (A) blackberries of the semitrailing type trained along two wires and (B) erect blackberries tied to two wires, one above the other. The Brainerd is commonly topped at the upper wire and four branches are trained along the wires.

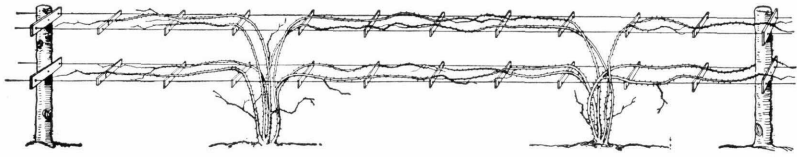


Figure 11.—Canes of semitrailing blackberries trained along four wires.

one near the top and the other about 2 feet below. Wires are strung through the ends of the crosspieces. Short pieces of wood held in place by notches are laid across the wires at intervals of 24 to 30 inches; the trailing canes are strung along the trellis on top of these or trained above and below the alternate cross strips. Sometimes both bearing and nonbearing canes are trained to the same wires. More frequently, however, the nonbearing canes are placed on the lower wires and the bearing ones on the upper. Sometimes, however, the bearing canes are placed on the lower wires and the nonbearing canes on the upper. Figure 11 shows the arrangement of the wires for this system. Because the shoots of the Brainerd are very stout, they are commonly topped just above the upper wires and the laterals are trained along wires (figs. 10 and 11). Figures 12 and 13 show variation of this arrangement in which the lower wires are left off.

The systems of training just described are the ones usually followed, but they are often varied to suit particular conditions or the convenience of the grower. When the plants are set in hills 5 feet or more apart each way, the canes may be pinched back at a height of about 3 feet in order to make the growth stocky. Frequently, when the plants are set in hills, a post is set by each plant and the canes are tied to it as shown in figure 14. The semitrailing varieties rarely are trained according to the hill system. In New Jersey the Evergreen has been trained to stakes like trailing blackberries, but a pole trellis 5 to 5½ feet high has come into use and is replacing the stakes.



Figure 12.—Himalaya blackberries trained to a high two-wire horizontal trellis.

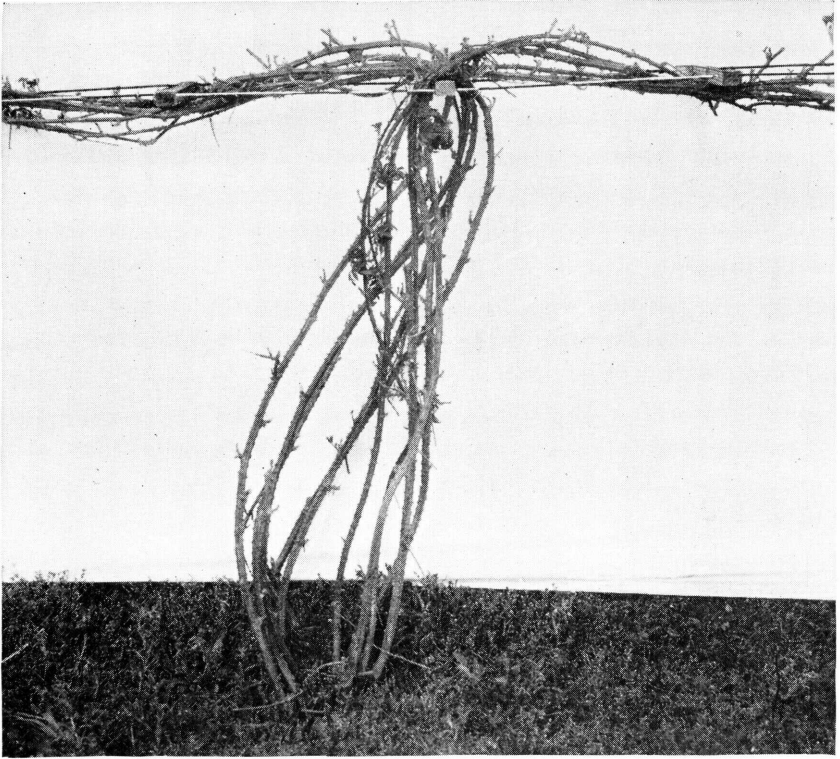


Figure 13.—Blackberry canes trained to a horizontal two-wire trellis of the type used for such varieties as the Evergreen, Brainerd, and Himalaya.

TRAILING BLACKBERRIES

Trailing blackberries need support to keep the fruit clean and to make harvesting easier. The system of training to be used depends on the climate, the cost of materials, and individual preference.

In North Carolina, where the Lucretia variety is almost the only variety grown commercially, the plants are usually set 5 by 5 feet and the stakes are usually at least 5 feet high. Under this system

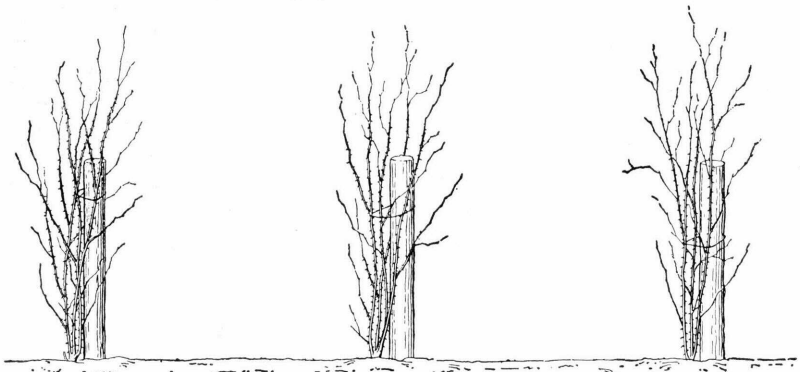


Figure 14.—Canes of erect blackberries tied to posts.



Figure 15.—Plant of the Lucretia trailing blackberry trained to a low stake in southern New Jersey.

cross-cultivation is possible and less hand labor is needed. In New Jersey the stakes are usually short, not over $3\frac{1}{2}$ to 4 feet high (fig. 15). The stakes, which are commonly made of southern yellow pine or cedar, are $1\frac{1}{2}$ by $1\frac{1}{2}$ to 2 by 3 inches in size and 5 to $5\frac{1}{2}$ feet long, driven 18 inches into the ground.

The canes are tied to the stakes in early spring just before growth starts. Gloves are worn while gathering the canes into a bundle and winding them around the stake in a spiral as shown in figure 5. In gathering up the canes care should be used not to break them, for if the wood is broken the fruit on such canes may not mature. The canes are tied to the stake in two or three places, once at the top and once or twice lower down. Soft string is used for the tying, as hard string may break the canes. The ends of the canes are bowed at the top of the stake before they are tied to prevent them from slipping down the stake (fig. 16).

In North Carolina and other States having a similar or a longer growing season, all the canes, both old and new, are cut off close to

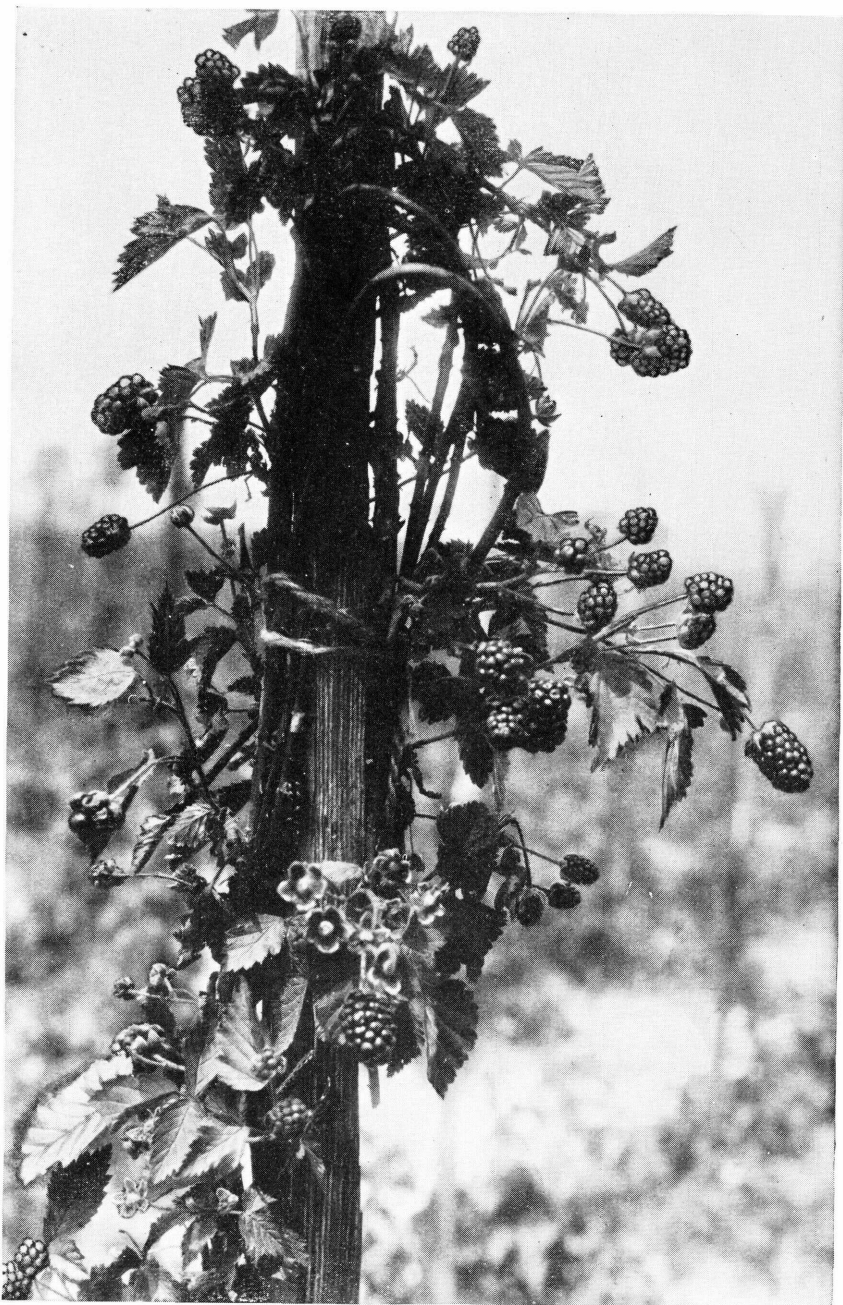


Figure 16.—Trailing-blackberry canes, the ends of which were bowed before they were tied at the top of the stake, in order to prevent slipping.

the crown of the plant immediately after harvest to aid in controlling rosette (double blossom), leaf spot, and anthracnose. Because the next year's crop depends on the amount of vigorous new growth, this

cutting out must be done promptly. Figure 17 shows a tool used for this purpose. Fertilizer should be applied (see p. 9) and cultivation started at once and continued until the new canes begin to interfere. The new canes are allowed to run on the ground and are left there until the next spring, when they are tied to stakes in the same manner as the previous year's growth.

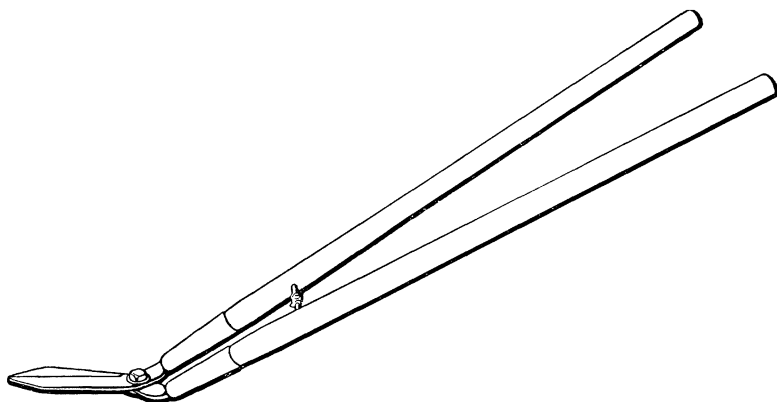


Figure 17.—Long-handled shears used in North Carolina for pruning trailing blackberries. Note that the steel blades are angled upward, thus enabling the pruner to cut the canes close to the crown without much stooping.

A wire trellis is used throughout the country for the Young and Boysen varieties and in southwestern Michigan, where stakes are expensive, for the Lucretia. The Lucretia plants are set about 2 to 2½ feet apart in rows 7 to 8 feet apart. Posts are set along the row from 20 to 40 feet apart, depending on their strength and the vigor of the canes. The posts project about 3½ feet above ground, and a wire is stretched along them about 2½ feet above ground. The canes are gathered together in a bunch and tied to the wire (fig. 18). The ends are usually cut off 8 to 12 inches above the wire. This system is the principal one used in southwestern Michigan, and it is sometimes used in eastern New York. Sometimes, however, the ends are tied along the wire and left to bear fruit. The two-wire trellis shown in figure 10, A, is liked by many growers for the Young and Boysen varieties.

In Kansas sometimes no trellis is used. The canes are trained along the ground in a row 2 feet wide and are lightly covered with straw in late fall. This straw is left on during the next spring, and the fruiting laterals grow up through the straw so that picking is much like that of strawberries.

In Pacific coast plantings very little staking is done, but a few growers use cedar stakes set 6 to 8 feet apart each way and 6½ to 7 feet above ground. Sometimes a cross arm is used, and the canes are looped over it.

In California, Oregon, and Washington, the two-wire vertical trellis (fig. 10, A) is most commonly used but often only a single wire is used. Both the single wire and the top wire of the two-wire trellis are about 4½ to 5½ feet above ground. The second wire, if used, is about 2 feet below the top wire.



Figure 18.—Plants of the Lucretia trailing blackberry trained to a one-wire trellis.

During the summer Pacific coast growers train the new canes on the ground along the row. They are held in place by small stakes about 2 feet long or by stiff wires curved into a U-shape and placed over the canes. In late summer or more commonly in early spring the canes are trained in various ways on the wires of the trellis.

The oldest method of training was that of the wreath, or weaving, system, in which one or a few canes are taken at a time and passed from upper to lower wires (fig. 19). At present the most common method is to divide the canes of a single hill, raise them to the upper wire, make one or two twists, and bring them down to the lower wire and back to the plant. Then the ends of the canes are usually cut off. Sometimes tying may be necessary to hold the canes

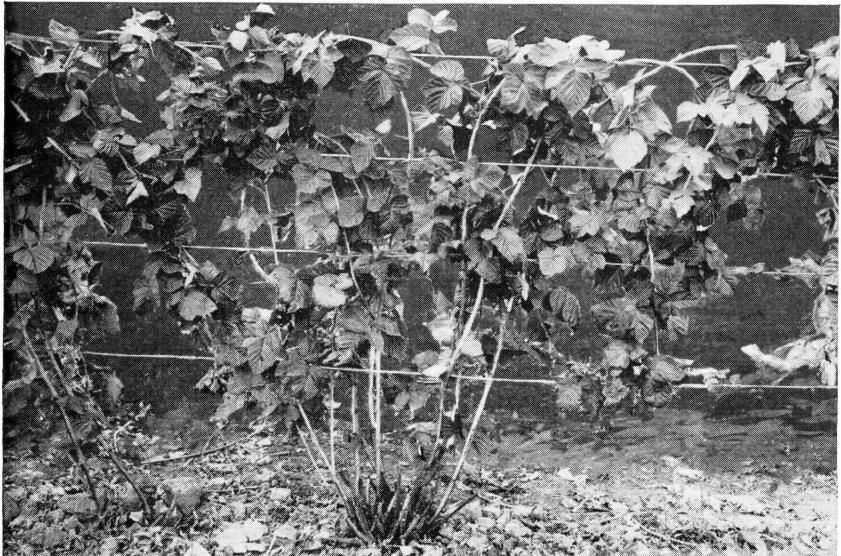


Figure 19.—Canes of the Logan trailing blackberry woven over a four-wire trellis so that each flower and fruit cluster will obtain as much light as is available.

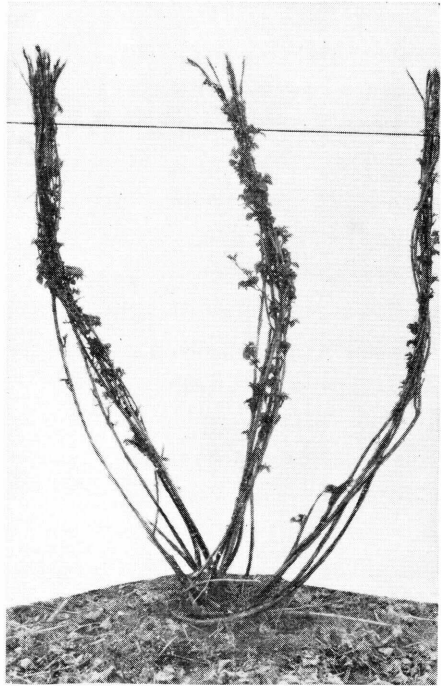
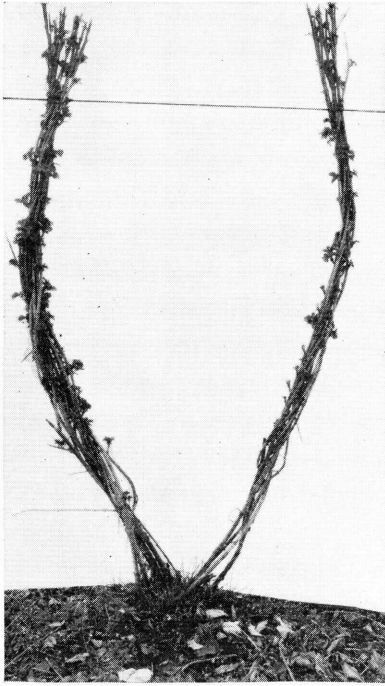
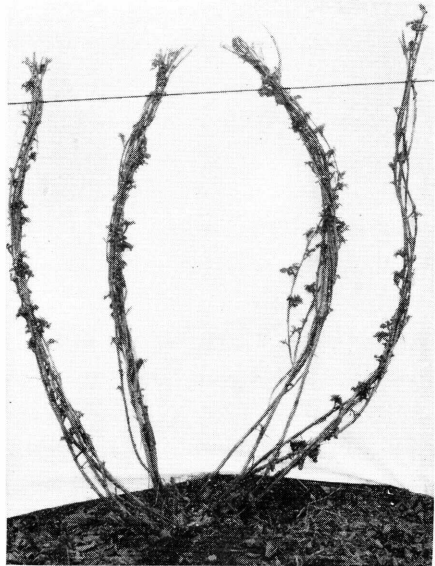


Figure 20.—One-wire trellis used for the Logan and other trailing blackberries. Note that the canes are tied to the wire in two, three, or four bundles, depending on the number of vigorous canes produced by the plant.



in place. This is often called the loop method of training (fig. 21). Often the canes are divided into 2, 3, or 4 bundles as in figure 20 and tied to a single wire. Another similar method is, instead of bending the canes back to the plant on the lower wire, that of extending the canes from the next plant.

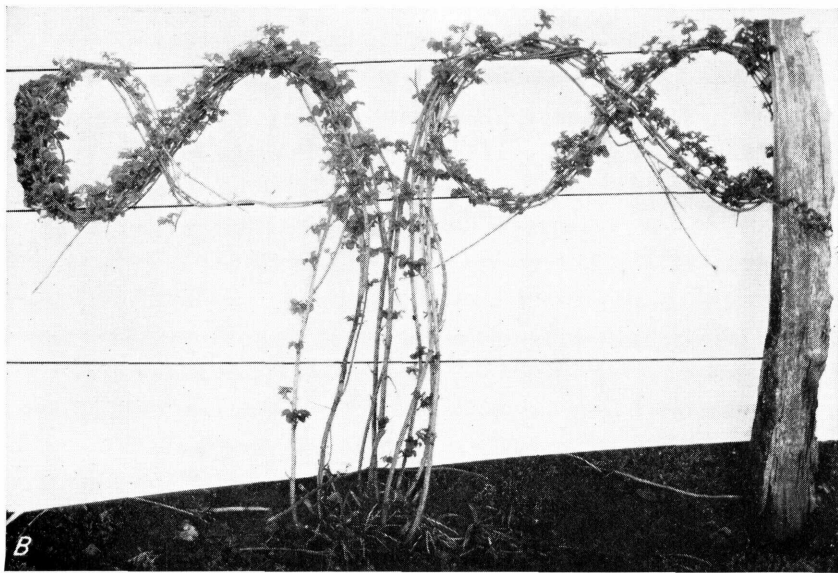
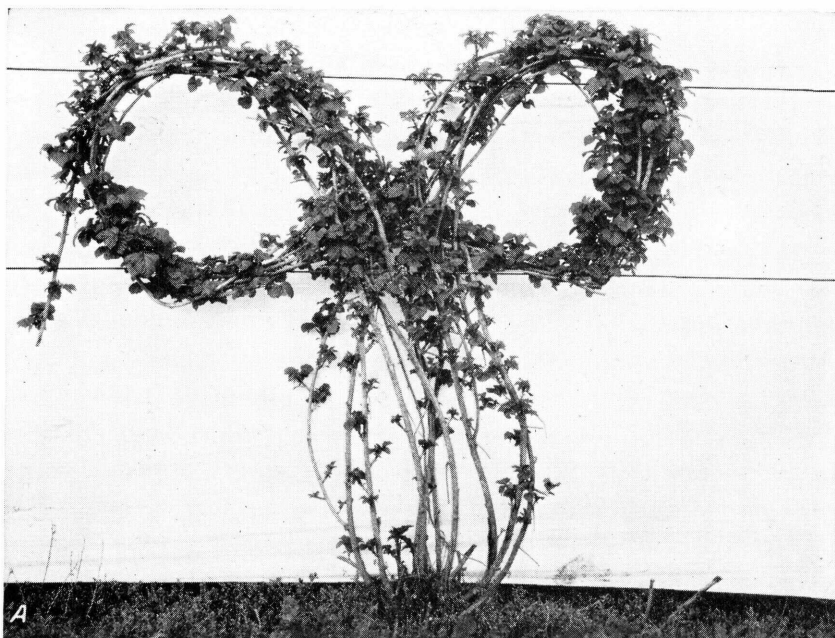


Figure 21.—Loop method of training Logan and other trailing blackberries to (A) a two-wire or (B) a three-wire trellis. Note that the canes are arched over the top wire and then looped around the second one.

Canes may also be divided into four parts and extended along both the upper and the lower wires. This method, however, involves more labor than some others. When only one wire is used, the canes may be divided and extended in both directions along the wire from the plant or all the canes may be extended in one direction.

HARVESTING

Fruit of each variety must be harvested according to its particular season of maturity. Berries of some varieties, the Eldorado for example, may be picked soon after they turn black; but those of most varieties are not ripe when they turn black. They should be picked while still firm enough to be marketed in good condition, but not before they become sweet.

The keeping quality of berries of any variety depends largely upon the care exercised in picking and handling. If they are bruised or



Figure 22.—A hand carrier for holding six quart or eight pint baskets and a waist carrier designed to hold a quart basket. Note that the waist carrier leaves both hands free for picking when the blackberries are trained on tall stakes or a trellis.

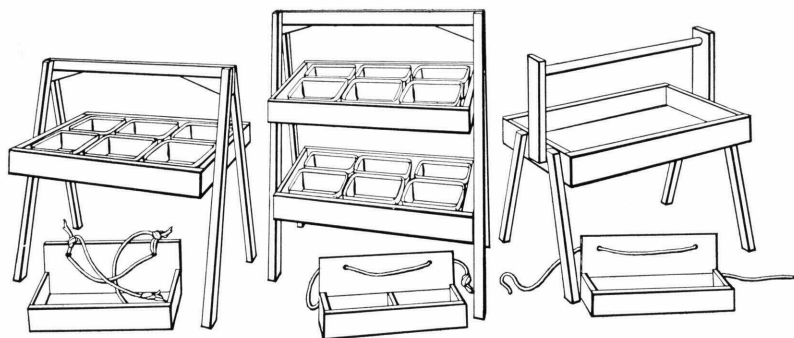


Figure 23.—Various types of waist and hand carriers used chiefly in picking blackberries and raspberries.

injured, molds and decay fungi quickly spoil them; but berries carefully picked and stored in a cool place will keep fresh for several days.

A plantation is usually picked over every other day or every third day. The Evergreen variety, however, produces very firm fruit, and a field of this sort is sometimes picked but once a week; in the Northwest it is picked once in 10 to 14 days.

Since blackberries ripen in midsummer, when the afternoons are often very warm, picking is usually done in the morning if only a part of the day is required. The berries may become even warmer than the air. As berries spoil quicker at a high temperature than at a low one, those picked in the afternoon, especially on hot days, will not keep so well as those picked in the early morning.

The berries should be placed in the baskets, not thrown. To make careful handling easy, waist carriers such as those shown in figures 22 and 23 should be used. As the baskets are filled they are placed



Figure 24.—Crate containing (A) Logan and (B) Mammoth blackberries.



Figure 25.—A 12-year-old field of Lucretia trailing blackberries in North Carolina. This field has averaged more than 3,200 quarts per acre since coming into bearing. (Photographed June 10.)

in a hand carrier, which is set in the shade of the bushes until it is taken to the packing house, where the baskets of berries are graded and packed (fig. 24).

In transporting the fruit to the market or shipping points, spring wagons or trucks with pneumatic tires should be used to lessen as much as possible the injury from bruising and to avoid the settling and mashing of the fruit in the baskets.

YIELDS

The yield of blackberries depends on the variety and the conditions under which the crop is grown. In certain sections where the soil is very deep and rich, yields of 5,000 quarts or more per acre may be obtained. Under average conditions of good management, about 2,300 quarts per acre can be harvested. In some seasons this yield will be greatly exceeded, but in others the yield will be smaller. The Evergreen, Brainerd, and Himalaya varieties regularly yield much more than 2,300 quarts in those sections of the Pacific slope to which they are adapted. With good care, 5 to 10 tons per acre of the Evergreen and Himalaya berries can be produced there.

The yields of trailing-blackberry plantations also vary greatly with the different conditions under which they are grown. The better plantations may yield 4,800 quarts, and some growers obtain crops of 3,200 quarts per acre year after year. Though the average yields may be somewhat smaller, good plantations favorably located should yield as much as just stated. Figure 25 shows part of a 12-year-old field of the Lucretia variety, which has averaged more than 3,200 quarts an acre per year since coming into bearing.

In North Carolina 1-year-old plants in good condition often yield 1,000 to 1,500 quarts per acre and 2-year-old ones a full crop. In Michigan no crop is expected until the second year, but a full crop is expected the third or fourth year. In Pacific coast districts, if growing conditions are favorable, a good crop may be obtained 2 years after planting, but usually a planting is not in full bearing until 3 years after it is set out.

In Oregon and Washington the Young and Logan varieties often average 2,600 quarts (about 2 tons) per acre, while Boysen blackberries usually yield 2,600 to 4,000 quarts (2 to 3 tons) per acre and sometimes 5,000 to 6,500 quarts (4 to 5 tons) per acre.

WINTER PROTECTION

ERECT BLACKBERRIES

The hardy varieties of erect blackberries can withstand temperatures of -20° F. if water does not stand in the soil around the roots and there are no severe drying winds. In localities where there is a real danger from cold, drying winds, as in the Midwestern States, or from severe winter temperatures, the canes are bent over in the fall and a layer of earth, straw, or coarse manure is thrown over them. This should be done before the ground is frozen, but after all danger of warm weather is past. Few canes will break if they are bent over while the sap still circulates. Sometimes the soil is drawn away from one side by means of a hoe or a plow and the plants are inclined to that side before being covered. The canes will bend over to the ground with less danger of breaking when this is done, but the roots may be injured somewhat when the earth is removed. The plants are uncovered in the spring after severe weather is past.

TRAILING BLACKBERRIES

In the Southern States and in most States where snow covers the ground through the winter, no protection of the canes of trailing blackberries is necessary, as they trail close to the ground. In some parts of the Midwestern and Northern States the canes must be protected during the winter.

In the Michigan section this is usually accomplished by covering the canes with 2 or 3 inches of earth. Some growers there cover only the first 2 or 3 feet of the basal growth, whereas many others believe that the cane to be saved for fruit bearing should be entirely covered. If the plants are in solid rows, this can be done very cheaply by turning a furrow slice about 3 inches deep onto the plants. The canes should be covered before there is danger of hard freezes and uncovered in the spring after the danger of freezing is past. Careful uncovering is necessary to prevent serious damage to the canes. In the Germantown district of New York protection is afforded by allowing weeds and grass to grow in the fields, and as these die in the fall they cover much of the growth and also hold the snow.

Straw has given good protection during cold winters in eastern Washington. In Kansas when no trellis is used, the canes are trained along the ground in a row about 2 feet wide and covered with straw in late fall.

Canes often show a form of winter injury when left lying on the ground during the mild, moist winters of western Oregon. Canes trained to the trellis in late summer prior to such winters show no injury and yield much larger crops the following spring. However, canes trained on the wires over winter may be injured if hard-freezing weather occurs.

PRODUCTIVE LIFE OF A PLANTATION

The roots of erect-blackberry bushes live for many years, but the length of time during which a plantation is profitable differs with conditions in different parts of the country. Where the humus burns out of the soil quickly and the soil washes readily, the plantation should be abandoned after five or six crops. In other sections, the plantation may be kept longer if the humus supply is maintained and the crowns of the plants do not become diseased.

The duration of a trailing-blackberry plantation will also depend on the section of the country in which it is located, on the system of training used, and on the attention given it. In North Carolina, plantations 15 years old are still productive. A few fields even older are still yielding well, but most of them have been planted too recently to make possible an accurate estimate of their probable life.

DISEASES AND THEIR CONTROL ¹

There are several serious diseases of blackberries—anthracnose, cane and leaf spot, crown gall, dwarf, orange rust, and rosette (double blossom). Other diseases which may be serious in some sections are cane blight, root rot, and cane rust. At present growers pay little attention to the last three diseases, but they undoubtedly cause considerable injury at times.

ANTHRACNOSE AND ROSETTE

Anthracnose and rosette (double blossom) are considered together because the same basic control measure is used on both. Anthracnose is serious in nearly all parts of the country, whereas rosette is common from New Jersey to Florida and west to Texas and Illinois. Rosette is so serious in Florida that the Advance, which seems not to be affected with this disease, is the principal variety grown.

¹ See Farmers' Bulletin No. 1488, Diseases of Raspberries and Blackberries.

In the Southeast and other parts of the South anthracnose and rosette are controlled on trailing blackberries by cutting off all canes, both old and new, immediately after harvest. Southern growers consider this cutting out the most important operation in the culture of trailing blackberries. Afterward they cultivate thoroughly and fertilize. Thus they obtain by fall vigorous new canes free from anthracnose and rosette for bearing the next year's crop.

Where the season is too short for growers to cut the canes after harvest and still obtain sufficient new growth by fall a dormant lime-sulfur spray should be applied just as growth begins in the spring. As a protection against rosette in such districts all infected buds should be picked off by hand soon after growth starts. In Louisiana, however, hand picking has not proved effective. There rosette can be controlled by spraying with 4-4-50 bordeaux mixture every 10 days until June 1. Only two or three sprayings will be needed if all new canes are cut off about May 1 so that only the May growth needs spraying.

CANE AND LEAF SPOT

In western Oregon and Washington the common cane and leaf spot, caused by *Mycosphaerella rubi*, is very serious on the Logan, Young, Boysen, and some of the varieties derived from the native trailing blackberry. This disease can be controlled by applications of bordeaux mixture (4-4-50) just before the fall rains begin and again just after the first leaves are fully developed.

CROWN GALL

Crown gall is a serious disease of most blackberry varieties. Plants with galls on the crown are often seriously dwarfed. Planting clean stock is the best control measure.

DWARF

Dwarf has sometimes become serious in the Logan plantings in Oregon. This is a virus disease that causes the leaves to have an abnormal yellowish-green color, accompanied by certain malformations and a general dwarfing. Fruit from dwarfed plants is usually crumbly and ripens unevenly. The most practical means of control is planting stock free from the disease.

NUBBINS

Many fields in the Eastern States contain a few to a large percentage of plants bearing little or no marketable fruit. In many cases these plants are simply mixtures of wild blackberries. The plants should be dug out as soon as they show up, for the unproductive plants are usually more vigorous than the productive ones and tend to replace them. There is also a flower disease that kills the anthers and pistils and prevents any berry development or causes dry berries. A microscopic mite causing a similar effect has also been reported.

ORANGE RUST

Orange rust is a fungus disease appearing on the undersurface of blackberry leaves in the spring soon after growth starts. The spores make the entire undersurface orange-colored. The disease is so serious that in the Northern States it has limited the growing of erect blackberries chiefly to the one highly resistant variety, Eldorado. The Lawton and Early Wonder varieties are said to be relatively free from

orange rust in Texas and Oklahoma. The Lucretia, Young, and Boysen trailing-blackberry varieties are not often affected. Plants showing the disease should be pulled or dug and destroyed and affected wild plants near the planting should be destroyed also to prevent spread of infection.

INSECTS AND THEIR CONTROL ²

Several insects are locally important pests of the erect and trailing blackberries, but none is generally serious throughout the range of the blackberry.

BLACKBERRY MITE

The blackberry mite attacks the developing fruit of the Evergreen and Himalaya varieties on the Pacific coast, causing the full-grown berries to stay a brilliant red and never ripen. Only late-ripening berries of the Logan, Mammoth, Crandall, and other varieties are affected. The blackberry mite is controlled by a fall spray of oil (3 gallons of oil to 97 gallons of water) or lime-sulfur (8 gallons to 92 gallons of water) and a delayed dormant spray of lime-sulfur (8 gallons to 92 gallons of water).

RASPBERRY FRUITWORM

In Oregon and Washington, the adults of the raspberry fruitworm, a beetle, feed on the first buds of the Logan, Boysen, and Young varieties before the flowers open; later they feed on the stamens and pistils. The eggs are laid on the flower buds, flowers, and young berries. The larvae work into the fruit and feed on the core of the berry, making it unfit for market; when grown, they drop to the ground and burrow into the soil, where they remain until the following spring, when they emerge as adult beetles. Where the pest is serious, as in Oregon and Washington, a dust containing 0.5 percent of rotenone or a spray containing 0.01 percent of rotenone is applied just as egg laying is started, or about 10 days after blossoming begins. Two later applications of the same material are made 7 and 14 days after the first dusting.

RASPBERRY ROOT OR CROWN BORER

The raspberry root or crown borer is one of the most widely distributed blackberry insects. It is known to be serious in New Jersey and in Oregon and Washington, especially on the Evergreen blackberry and the red raspberry. The moths lay their eggs in August and September on the leaves and shoots of the blackberry. The larvae burrow into the shoots near the surface of the soil. The next spring they start to feed in the crown and roots. In New Jersey, at least, they emerge as adults in late summer and lay their eggs. An oil emulsion (83 percent of actual oil used at the rate of 1 part to 150 parts of water) to kill the eggs has been used successfully in New Jersey. It is applied at 2-week intervals from August on. Because the eggs are on the under side of the leaves, the spray must be applied with 200 pounds' pressure or more and should be directed up under the leaves.

² See CRUMB, S. E. INSECTICIDE PROGRAM FOR RASPBERRY FRUITWORM CONTROL. U. S. Bur. Ent. and Plant Quar. E-433, 3 pp. 1938 [Processed]; and CAFFREY, D. J. SOME INSECTS AND OTHER PESTS ATTACKING RASPBERRIES AND BLACKBERRIES AND HOW TO CONTROL THEM. U. S. Bur. Ent. and Plant Quar. E-449, 5 pp. 1938 [Processed].

RED-NECKED CANE BORER

The most serious and widespread insect pest is the red-necked cane borer, native from New England to Minnesota and Missouri and south to Oklahoma and the Gulf States. It has been particularly serious on the Young and Boysen varieties from Maryland and Virginia west to Missouri; in some of these States it limits their production. It also attacks other blackberries and the raspberries. The adults are leaf-feeding beetles which lay their eggs near the base of the new shoots from May to July, mostly in June. The larvae feed just under the bark, girdling the shoot and causing swellings, or galls, 1 to 3 inches long, as shown in figure 26. They burrow down the cane to the roots as cold weather approaches and overwinter there.

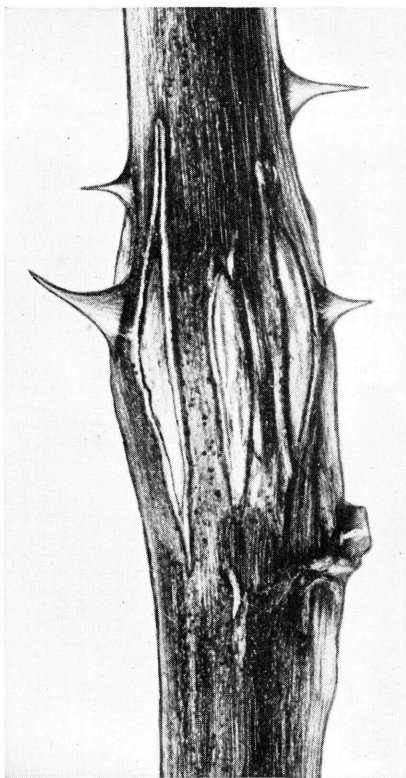


Figure 26.—Gall made by larvae of the red-necked cane borer.

The shoots are weakened and usually die at the gall during the winter or spring. The fruit on the weakened canes usually does not mature.

Fully effective control is unknown. Cutting out and burning infested canes before the borers go down to the roots should help; in some districts these measures are considered fully effective in the control of the red-necked cane borer.

RED SPIDER

The common red spider may become a serious pest on fields in any part of the country. In wet years it does little damage, but in dry seasons it may weaken the leaves and plants so much that the plants shed their leaves and do not mature any fruit. The plants may die. A summer-oil emulsion, 2 to 3 quarts to 100 gallons of water, applied with 200 pounds' pressure or more gives excellent control. As the mites are chiefly on the under side of the leaves, the spray should be directed up under the leaves. Where the

canes are on the ground in late summer, it is difficult to get the spray onto the under side of the leaves. Sulfur dust applied when the temperature is high is also recommended, but it must be used with care. Sulfur is most effective at temperatures of 75° F. or more but it is also injurious to plants at such light temperatures.

STRAWBERRY WEEVIL

The strawberry weevil may become a serious pest of the trailing blackberry in some Eastern States where the insect is abundant or where the plantings adjoin strawberry fields. The weevils lay their

eggs in the flower bud and then cut the stem just below the bud. In severe infestations nearly all buds may be cut off, causing a loss of most of the crop. Spraying or dusting the plants as soon as the weevils begin to lay their eggs, just at blossoming time, should control them. A mixture of calcium arsenate and sulfur dust (15-85) is the standard control measure.

As mixtures containing arsenic are very poisonous, they should be handled and stored carefully.

VARIETAL ADAPTATION

ERECT AND SEMITRAILING VARIETIES

The different kinds of erect and semitrailing blackberries are classified according to their resistance to severe weather conditions. They are termed "hardy," "semihardy," or "tender." A hardy variety should be able to withstand a winter temperature of -20° F., as well as the changing temperature of the Midwestern States, where comparatively high winter temperatures sometimes occur. A semihardy variety winterkills in places where the temperature goes as low as -15° . It may pass through some winters safely, but in others it may freeze to the ground. This semihardy class is also severely injured by the frequent temperature changes which occur in winter in certain sections of the Midwestern States. The tender varieties are suited to the Southern States and western Oregon, Washington, and California, where mild winters prevail. They will not stand low temperatures and should be planted only where the thermometer seldom reaches zero.

The Eldorado is by far the leading variety of the Northern and the Northeastern States. Certain varieties originated in the Southwest are peculiarly adapted to the semiarid conditions there. These varieties, which include the Early Wonder, Dallas, McDonald, and Haupt, are somewhat drought-resistant and mature their fruit before the season becomes too warm.

On the Pacific coast are grown some of the varieties that are common in the East as well as some that are not adapted to cultivation in other parts of the United States. The varieties usually grown on the west coast are the Lawton, Eldorado, Crandall, Himalaya, Evergreen, and Brainerd. Of these, the Crandall, which is liked in eastern Texas, is rarely grown successfully elsewhere except in California. Even on the Pacific coast there is such wide variation in temperature, winds, and moisture supply that these varieties can be grown only in certain districts.

In considering what sorts to grow, first decide whether the local conditions will permit the cultivation of the tender or semihardy blackberries. It will not be profitable to plant varieties which are not sufficiently hardy. On the other hand, many northern varieties are subject to nematodes in the Southern States. Inquiry among neighboring growers will determine the varieties that have already proved successful, and the most promising of these should be selected.

Figure 27 illustrates where the varieties of erect and semitrailing blackberries are grown and succeed best.

TRAILING VARIETIES

The areas to which the different varieties of trailing blackberries are best adapted are indicated in figure 28. The Lucretia is grown

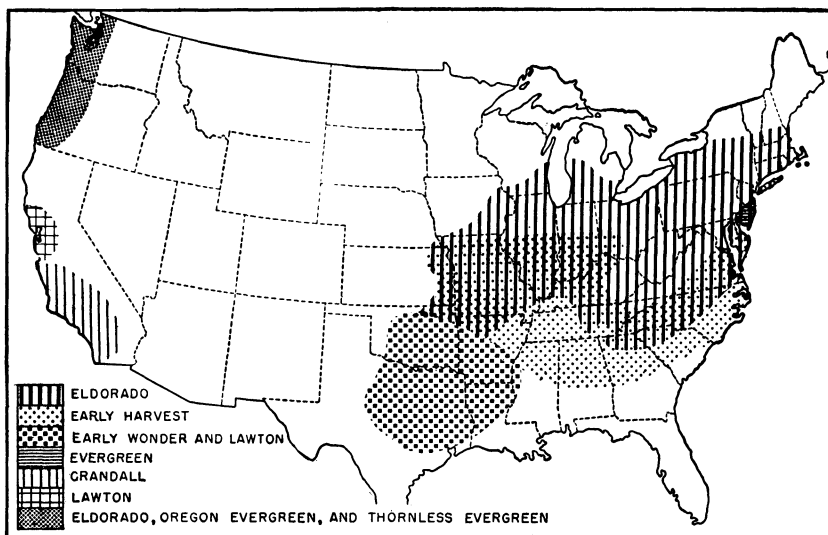


Figure 27.—Map of the United States showing where erect and semitrailing varieties of blackberries succeed best.

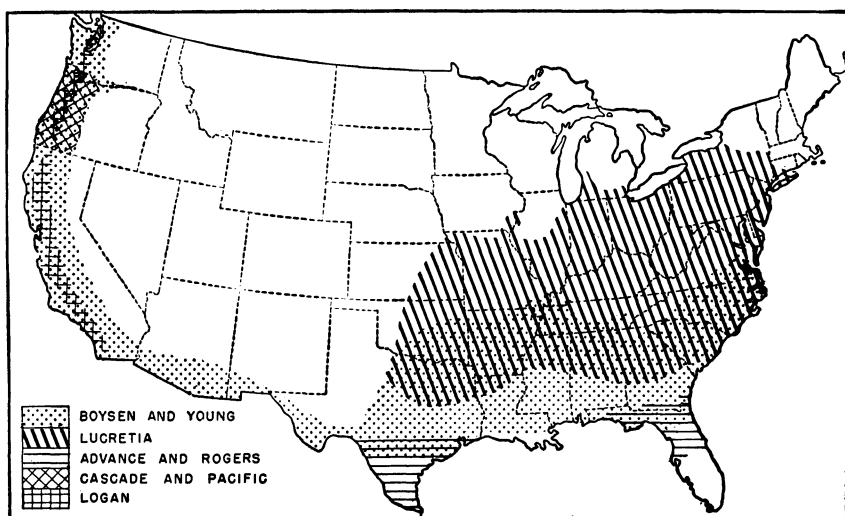


Figure 28.—Map of the United States showing where varieties of trailing blackberries succeed best.

most extensively in North Carolina, Michigan, New Jersey, and New York; possibly there are 3,000 to 4,000 acres of this variety in these four States alone. According to the 1940 census, there were 3,642 acres of the Young, mostly in Oregon, California, Arkansas, Washington, and Oklahoma; 2,815 acres of the Logan, mostly in Oregon, Washington, and California; and 1,923 acres of the Boysen, mostly in Oregon, California, Washington, Arkansas, and Oklahoma. The annual crop value of the trailing blackberries was approximately \$2,000,000.

VARIETAL CHARACTERISTICS

The characterizations herein are intended to aid prospective growers in selecting varieties adapted to their districts and to the purposes for which they intend to grow blackberries. Only those varieties successfully grown throughout large areas of the United States are included.

ERECT, SEMIERECT, AND SEMITRAILING VARIETIES

Alfred.—Michigan origin. Berries large, firm, sweet; quality very good; season a week earlier than that of Eldorado. Bushes very vigorous, hardy, productive. Promising variety of the erect type for the Northern States, especially Michigan. Susceptible to orange rust.

Blowers.—New York origin. Berries large, firm, acid until ripe; quality good; season early midseason and long. Bushes vigorous, hardy, productive. Adapted to the Northeastern States; also grown successfully in Kentucky and Michigan. Susceptible to orange rust.

Brainerd.—Hybrid of the Himalaya and an eastern sort originated by United States Department of Agriculture, but essentially a Himalaya in plant type. Berries about 50 percent larger than those of the Himalaya, high-flavored, not turning red after picking and therefore unlike berries of many other varieties; season after that of commonly grown erect varieties. Bushes grown and trained like those of the Himalaya, usually hardy as far north as New Jersey and central Illinois. Grown commercially in Arkansas and western Oregon more than elsewhere.

Crandall (Macatawa, Everbearing).—Texas origin. Berries large, firm, sweet; quality very good; season very early and long. Bushes vigorous, semierect, making few suckers, tender (limits of hardiness not known), productive. Leading variety in southern California; liked in eastern Texas; not adapted to Northeastern States.

Dallas.—Texas origin. Berries large, firm; quality very good; season early. Bushes vigorous, semierect, semihardy, productive. Grown in Texas and Oklahoma.

Delsweet.—Semibroadleaved sport of Evergreen producing berries of slightly better quality.

Early Harvest.—Illinois origin. Berries medium-sized, firm; quality good; season early and long. Bushes moderately vigorous, erect, making fewer suckers than some other varieties, often needing heavy pruning to prevent too heavy crop, not hardy in the North, very productive in the South. Desirable variety in most of the South; grown as far north as Maryland and southern Illinois; the Early Wonder perhaps better where hardy. Very susceptible to orange rust.

Early Wonder.—Texas origin. Berries medium-sized, firm; quality very good; season medium early. Bushes vigorous, semierect, productive. A leading variety in Texas and Oklahoma.

Eldorado (Stuart, Lowden, Texas).—Ohio origin. Berries medium-sized to large, firm, sweet; quality very good; season early to midseason and long. Bushes very vigorous, hardy, productive. One of the best varieties in most of the sections adapted to blackberries except the extreme South. Known in Oregon and Washington as the Stuart and Texas and in Canada as the Lowden. Most resistant to orange rust of the widely grown varieties.

Evergreen (Black Diamond).—Origin unknown; grown in Europe since 1809. Berries large, exceptionally firm, sweet; quality good; seeds large; season late to very late and long, ripening after other blackberries. Bushes vigorous, semihardy, deep-rooted, drought-resistant, productive; canes semitrailing, rooting at tips, trained to a two- or a four-wire trellis (figs. 10 and 11) in Oregon and Washington and to a pole or a wire trellis 5½ feet high or to stakes like trailing blackberries in New Jersey; planting distances—6 by 8 feet in New Jersey and 16 by 8 feet in Washington and Oregon. One of the best varieties in Oregon and Washington, but not generally adapted to the States east of the Rocky Mountains, except New Jersey, where it is profitable; growing possible as far south as Maryland along the Atlantic coast, if care taken to control rosette (double blossom) by picking off affected buds early in the spring; now growing wild in Oregon and Washington; plants for commercial fields sometimes grown from seed; being replaced by the thornless sport of it.

Haupt.—Texas origin. Berries large, fairly firm; quality good; season very early, ripening about 2 days after the McDonald. Bushes very productive, probably tender except in Texas and other Southern States; canes trailing the first year, more upright the second year, rooting at tips. Grown slightly in central and eastern Texas; not liked in Missouri.

Himalaya (Theodor Reimers).—Generally supposed to have originated in California, but apparently the same as the Theodor Reimers, which originated in Germany. In California berries medium-sized, rather soft, sweet; quality good to very good; seeds large; season late. Bushes very vigorous, tender, very productive in some sections; canes semitrailing (fig. 12), rooting at tips, perennial in California, but biennial unless new canes removed; planting distances—8 by 8 feet in southern California and 8 by 20 to 30 feet in Washington, the distance differing according to vigor. Standard blackberry for its season in California for home gardens and local markets; also grown a little in Oregon and Washington, but not generally liked there so well as the Evergreen and Brainerd; not adapted to the United States east of the Rocky Mountains; probably replaceable by the Brainerd except in California. Immune from rosette (double blossom).

Iceberg.—California origin; essentially a white-fruited Early Harvest. Berries large, amber white, soft; quality very good; season early midseason. Bushes semihardy. Not adapted to market use, but desirable for home use because of color.

Lawton (New Rochelle).—New York origin. Berries large, soft when fully ripe, sweet; quality good; season early midseason. Bushes vigorous, nearly hardy, productive. Grown in Texas and Oklahoma and slightly in other parts of the United States; liked especially for canning in Texas. Resistant to orange rust.

McDonald.—Texas origin; hybrid of erect and trailing blackberries. Berries large, firm; quality very good; season very early, 2 weeks before the Dallas and Early Harvest. Bushes vigorous, tender, drought-resistant, very productive; canes trailing the first year, more upright the second year, rooting at tips; should be planted with another variety, as the Early Wonder, which blossoms at the same time, because self-sterile. Grown in the Gulf region.

Mersereau.—New York origin. Berries large, firm, sweet; quality very good; season early midseason and short. Bushes vigorous, hardy, fairly drought-resistant, productive. Grown somewhat in Central and Eastern States but replaced by the Eldorado in some sections. Susceptible to orange rust.

Nanticoke (Hirschi, Healthberry).—Maryland origin. Berries medium-sized, soft, sweet; quality very good; season very late and long, beginning to ripen after the Eldorado has finished, ripening during August and September in Maryland. Bushes vigorous, hardy in Maryland, drought-resistant, productive, very thorny. Not adapted to general market, but especially adapted to home use.

Snyder.—Indiana origin. Berries medium-sized, not very attractive, firm; quality good; season early midseason and short. Bushes vigorous, hardy, not drought-resistant, productive, not producing many laterals. Grown in northern United States; not adapted to heavy clay; of value chiefly for its hardiness. Less susceptible to orange rust than most other varieties.

Thornless Evergreen.—Thornless sport of the Evergreen, largely replacing the thorny Evergreen in New Jersey and beginning to replace it in Oregon and Washington. Propagated from tip plants only, because of coming thorny from roots.

Ward.—New Jersey origin. Berries large, firm, sweet; quality good; season late. Bushes vigorous, hardy, productive. Grown in Oklahoma and slightly in the northern United States east of the Rocky Mountains.

TRAILING VARIETIES

Advance.³—Two distinct varieties sold together as Advance, because either alone sterile. Berries large, exceptionally firm; quality good; earliest of all in Florida, ripening in April and May. Grown in southern California and in Florida; three new Texas varieties of similar type (Earliness, Bigness, and Regalness) suggested for testing by growers of Advance. Immune from or very resistant to rosette (double blossom).

³ Possibly same as Rogers.

Boysen (Boysenberry, Nectar, Rossberry, Lavaca).—Origin unknown; introduced in 1935 in California. Berries similar to those of the Young, but somewhat larger, more tart, and ripening about 10 days later; like those of the Young, too soft for long-distance shipment. Because of its very large berries, replacing the Young to a considerable extent in California, Oregon, and Washington, but because of its lateness in ripening less desirable in much of the South. Recommended for the same sections and uses as is the Young.

Cascade.—Oregon origin; perfect-flowered variety from a cross between the Zielinski, a variety of the native Pacific coast trailing blackberry, and the Logan; introduced in 1940. Berries resembling those of the native Pacific coast trailing blackberry in many respects, especially in excellent flavor; bright deep red; dessert quality best. Plants vigorous, not hardy except in the Pacific coast region, very productive. Recommended for western Oregon and Washington only.

Cory Thornless (Thornless Mammoth, Bowenberry).—Thornless sport of the Mammoth blackberry.

Franklin D.—Either identical with the Boysen or if slightly different slightly less satisfactory.

Ideal Wild (Santiam).—Origin unknown; perfect-flowered variety derived from the native Pacific coast trailing blackberry. Berry and plant characteristics similar to those of the Cascade, Johnson, and Pacific; berries much smaller than those of the Cascade or Pacific and about the same size as those of the Johnson; flavor characteristic of the native Pacific coast trailing blackberry. Raised to some extent in western Oregon, but being rapidly replaced by the Cascade. Like the Johnson, very susceptible to the cane and leaf spot.

Johnson.—Recent introduction originating in the coastal section of Oregon; parentage unknown; possibly a cross between the Logan and the native Pacific coast trailing blackberry, resembling the latter in many respects. Berries rather small, excellent-flavored, not equaling those of the Cascade. Plants productive. Very susceptible to the cane and leaf spot.

Logan (Loganberry).—California origin; oldest trailing-blackberry variety of the Pacific coast. Grown from seed of the Aughinbaugh variety of Pacific coast trailing blackberry by Judge J. H. Logan, Santa Cruz, Calif., 1881 (insect-pollinated by a red raspberry, probably Red Antwerp, in Judge Logan's garden). Berries large, long, dark red, acid, and high-flavored. Plants vigorous, not hardy in eastern United States, very productive. Formerly most widely grown variety on Pacific coast, now partly replaced by the Young and the Boysen varieties. Grown for local and distant markets, canning, freezing, and juice making and to some extent for wine making; according to a recent report, about 2,500 acres planted to the Logan in England.

Lucretia (Bingleberry).—West Virginia origin; oldest and most widely grown trailing-blackberry variety; found soon after Civil War and brought to general notice about 1886. Berries large, long, firm; picked for shipping as soon as black, but not very sweet unless left on plants a day or two longer; quality good; season about June 1 in the North Carolina section, later than the Mayes. Plants vigorous and productive. Hardy in protected locations even in the Northern States, but in Iowa, Minnesota, Colorado, and neighboring States usually protected in the winter by being covered with soil. Susceptible to anthracnose and leaf spot.

Mammoth.—Originated by Judge J. H. Logan, Santa Cruz, Calif., in 1881 at the time the Logan appeared, probably a cross between the Crandall and the Aughinbaugh. Grown little now, because self-sterile.

Mayes (Austin Mayes).—Texas origin. Berries large, not so long as those of the Lucretia (fig. 2, A), with large drupelets, too soft for shipping far, quality good; season at least a week before that of the Lucretia. Plants vigorous, more productive than those of the Lucretia. Leading variety in Texas and grown to a slight extent in many other States. Susceptible to anthracnose and rosette (double blossom).

Nectar.—Reported to be a seedling of Young, but almost identical with, if not identical with, Boysen.⁴

Pacific.—Oregon origin; from a cross between the native trailing-blackberry variety Zielinski and the Logan; very similar to the Cascade but not so vigorous

⁴ See Boysen.

in growth, and of less value; introduced in 1940. Berries somewhat larger, having an excellent flavor, similar to those of the native Pacific coast trailing blackberry.

Rogers.⁵—Found near Alvin, Tex.; introduced about 1893. Canes red hairy like those of southern coastal trailing blackberry; similar to the Advance.

Thornless Boysen.—All plants seen under this name proved to be the Thornless Young.

Thornless Logan.—A thornless sport of the Logan, similar to the Logan except for absence of thorns and fully as good. Root cuttings always thorny. Plants productive. Variety becoming popular in Pacific Coast States where the Logan is grown.

Thornless Young.—A thornless form of the Young, similar to the Young except for absence of thorns; leaves usually cupped more than those of the thorny Young.

Young (Youngberry).—Originated about 1905 by B. M. Young, of southern Louisiana, as the result of a cross of the Phenomenal and the Mayes; introduced in 1926. Berries larger than those of the Lucretia, attractive, deep-wine-colored, much sweeter than those of the Logan, Boysen, or Lucretia when ripe; one of the best of all blackberries for freezing and for jam, holding flavor well; dessert quality high, milder than the Boysen, expressed juice apparently equal to that of the Logan; season about the same as that of the Lucretia, continuing about 10 days longer. Plants more vigorous than those of the Lucretia; hardy 100 miles south of Washington, D. C., but not so hardy as the Lucretia. Widely grown in the Southern States and the Pacific Coast States; recommended from Richmond, Va., to northern Arkansas and south to southern Georgia and the Gulf coast and for the sections of the Pacific Coast States west of the Cascade Mountains. Canes somewhat resistant to anthracnose and the foliage to the common leaf spot; buds susceptible to rosette (double blossom) in the Southern States.

Zielinski.—Pistillate variety derived from the native Pacific coast trailing blackberry and raised to a slight extent in Oregon; planting pollinizers such as the Ideal Wild, Young, or Logan necessary. Berries of very high quality. Being replaced by the Cascade.

HYBRIDS AND NOVELTIES

Several hybrids of the erect and trailing blackberries (or dewberry) have been classed in this bulletin with blackberries. Hybrids of the blackberry and raspberry except the Logan have not been discussed. None except the Logan has proved of value in this country. The Phenomenal, similar to the Logan, is rarely grown now.

⁵ See Advance.

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